Where:

f = frequency of the dynamometer speed sensing device, in s^{-1}, accurate to at least four significant figures.

d_{roll} = nominal roll diameter, in m, accurate to the nearest 0.01 mm, consistent with §1066.225(d).

n = the number of pulses per revolution from the dynamometer roll speed sensor.

Example:

f = 2.9231 Hz = 2.9231 s^{-1}
d_{roll} = 904.40 mm = 0.90440 m
n = 1 pulse/rev

$$S_{act} = \frac{2.9231 \cdot 0.90440 \cdot \pi}{1}$$

S_{act} = 8.3053 m/s

(ii) Compare the calculated roll speed, $S_{act,}$ to the corresponding speed set point, $S_{ref,}$ to determine a value for speed error, $S_{error,}$ using the following equation:

$$S_{error} = S_{act} - S_{ref}$$

Eq. 1066.235-2

Example:

S_{act} = 8.3053 m/s
S_{ref} = 8.3000 m/s
S_{error} = 8.3053 − 8.3000 = 0.0053 m/s

(2) *Frequency method.* Use the method described in this paragraph (c)(2) only if the dynamometer does not have a readily available output signal for speed sensing. Install a single piece of tape in the shape of an arrowhead on the surface of the dynamometer roll near the outer edge. Put a reference mark on the deck plate in line with the arrow. Install a stroboscope or photo tachometer on the deck plate and direct the flash toward the tape on the roll. The stroboscope or photo tachometer must be calibrated according to the instrument manufacturer's instructions and be capable of measuring with enough accuracy to perform the procedure as specified in this paragraph (c)(2). Determine the speed error as follows:

(i) Set the dynamometer to speed control mode. Set the dynamometer speed to a value between 15 kph and the maximum speed expected during testing. Tune the stroboscope or photo tachometer until the signal matches the dynamometer roll speed. Record the frequency. Determine the roll speed, $y_{act,}$ using Equation 1066.235–1, using the stroboscope or photo tachometer's frequency for f.

(ii) Compare the calculated roll speed, $y_{act,}$ to the corresponding speed set point, $y_{ref,}$ to determine a value for speed error, $y_{error,}$ using Equation 1066.235–2.

(d) *Performance evaluation.* The speed error determined in paragraph (c) of this section may not exceed ±0.02 m/s.

§1066.240 Torque transducer verification and calibration.

Calibrate torque-measurement systems as described in 40 CFR 1065.310.

§1066.245 Response time verification.

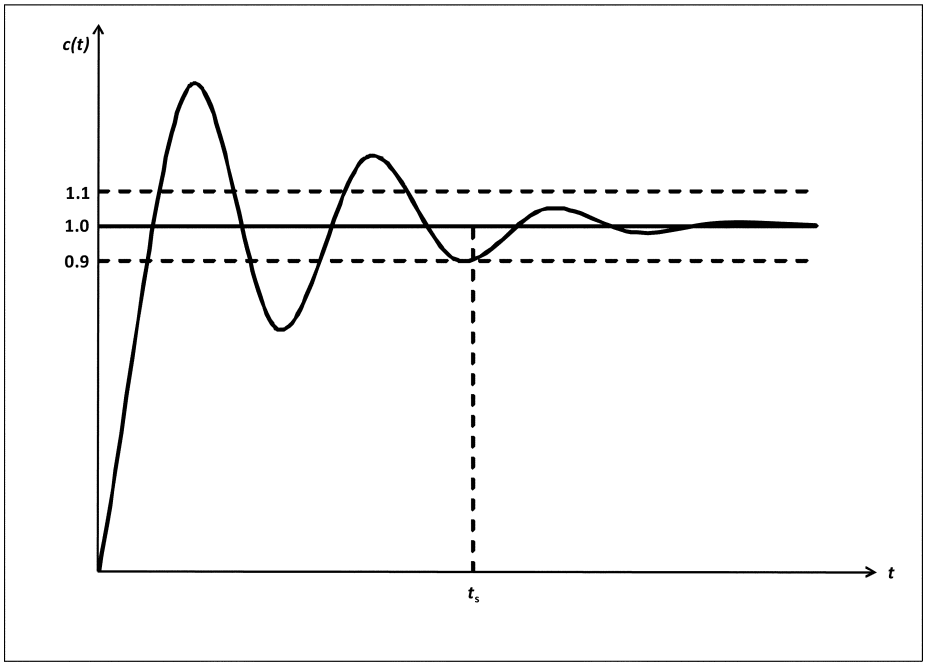
(a) *Overview.* This section describes how to verify the dynamometer's response time.

(b) *Scope and frequency.* Perform this verification upon initial installation and after major maintenance.

(c) *Procedure.* Use the dynamometer's automated process to verify response time. Perform this test at two different inertia settings corresponding approximately to the minimum and maximum vehicle weights you expect to test. Use good engineering judgment to select

road-load coefficients representing vehicles of the appropriate weight. Determine the dynamometer's settling response time, t_s, based on the point at which there are no measured results more than 10% above or below the final equilibrium value, as illustrated in Figure 1 of this section. The observed settling response time must be less than 100 milliseconds for each inertia setting.

Figure 1 of §1066.245—Example of a settling response time diagram.



§ 1066.250 Base inertia verification.

(a) *Overview.* This section describes how to verify the dynamometer's base inertia.

(b) *Scope and frequency.* Perform this verification upon initial installation and after major maintenance.

(c) *Procedure.* Verify the base inertia using the following procedure:

(1) Warm up the dynamometer according to the dynamometer manufacturer's instructions. Set the dynamometer's road-load inertia to zero and motor the rolls to 5 mph. Apply a constant force to accelerate the roll at a nominal rate of 1 mph/s. Measure the elapsed time to accelerate from 10 to 40 mph, noting the corresponding speed and time points to the nearest 0.01 mph and 0.01 s. Also determine average force over the measurement interval.

(2) Starting from a steady roll speed of 45 mph, apply a constant force to the roll to decelerate the roll at a nominal rate of 1 mph/s. Measure the elapsed time to decelerate from 40 to 10 mph, noting the corresponding speed and time points to the nearest 0.01 mph and 0.01 s. Also determine average force over the measurement interval.

(3) Repeat the steps in paragraphs (c)(1) and (2) of this section for a total of five sets of results at the nominal acceleration rate and the nominal deceleration rate.